

Book Reviews

INTERPRETING DNA EVIDENCE. By Ian W. Evett and Bruce S. Weir. Sunderland, MA: Sinauer Associates. 1998. 278 pp. ISBN 0-87893-155-4. \$34.95 (paper).

Through nine chapters of this monograph, two internationally recognized experts summarize their views on the interpretation of DNA evidence as used in forensics and parentage testing. Basic principles of probability theory, standard statistical distributions, and population genetics, discussed in the first three chapters, set the stage for statistical interpretations of DNA evidence, which are presented under the separate chapter headings of transfer evidence, parentage testing, and analysis of mixtures of DNA from two or more sources. Concepts of independence of alleles within and across loci are outlined in a chapter called "Statistical Genetics." Computations of match probabilities and presentation of evidence in courts constitute the theme of the remaining two chapters. Appendix materials include numerical tables of normal and chi-square distributions and keys for solving exercise problems listed in the individual chapters.

In the foreword, the authors note that forensic analysts are "often uncomfortable with statistics" (p. xiv) and hence, the authors have taken a "gentle pace" on relevant concepts to set the stage for their suggested interpretative guidelines. The materials covered mostly meet this criterion, and the authors must be commended for their effort to go through the statistical logic as rigorously as was practical. Even though the DNA technology used in forensics and parentage testing is still evolving, the breadth of the topics covered will make this volume a handy reference source book for years to come. In this sense, by and large this is a successful project for which the authors must be congratulated.

DNA evidence is basically the outcome of molecular typing of biological materials,

and as a consequence, inference from models of statistical analyses can only be approximate. The discussions on the biological aspects of the evidence are somewhat weak in this volume, and as a consequence, readers with a lesser appreciation of statistics and mathematics may be bewildered by the complexity of coefficients and parameters introduced to address some topics. For example, while the conditional probabilities of equation (4.20) are artfully derived through the development of 15 descent measures on p. 118–120, the premises of limited applications of these conditional probabilities are not sufficiently emphasized. It is true that the authors, at the bottom of p. 120, stated that these formulae are useful when the suspected and the true contributors of the DNA of evidence samples both belong to the same subpopulation, but the allele frequencies are not available for that specific subgroup of individuals. Nonetheless, it should have been emphasized that this stipulation is often missing in actual casework analysis, in which other simpler probabilities are enough (which is clearly spelled out in the National Research Council (1996) report).

While the rigor and mathematical accuracy of the logic are the unifying theme of all discussions in this volume, some inadequacies in this respect are apparent to expert eyes. For example, the derivation of the paternity exclusion probability (p. 181) is based on the assumption of the strict independence of alleles, and it applies when the accused father and the mother are from the same population. More general formulations of this problem exist in the literature (Chakraborty et al., 1988), and even in this simple case, the equation for Q (p. 181) can be further simplified in terms of sums of powers of allele frequencies (Chakravarti and Li, 1983).

Throughout the volume, the authors argue that the likelihood ratio (LR) approach is the unified procedure for addressing all forensic and parentage testing evidence. In principle, they are correct, and they note that in some simple cases, the frequency

approach is mathematically equivalent to the LR approach (p. 28). Nonetheless, the "transposed conditioning" (p. 227) verbal explanation of the estimated LR is a common problem when experts present LR calculations in courts. In this context, not everybody will agree with the authors' contention that "in cases that involve any kind of complication a Bayesian analysis is unavoidable" (p. 28). A likelihood ratio, by itself, is not Bayesian logic; only when the "posterior odds" (see p. 19) are computed from the LR estimated from the observation (e.g., DNA evidence) does one embark on a Bayesian journey. Thus, even in cases (e.g., for mixture interpretation, or for computing paternity indices) where the LR is unavoidable, the explanation may be phrased without invoking Bayesian logic. Having made considerable efforts to justify the assumptions underlying the computation of relative frequencies or of the LR, an arbitrary stipulation of any prior probability is outside the province of DNA experts.

In summary, and in spite of the above comments, this volume is highly recommended for DNA analysts. With the help of

some tutoring, DNA analysts should be able to use the materials discussed in this volume for statistical assessment of almost all DNA evidence. The experiences of both authors are reflected in the writing, and the materials are well-suited for students and analysts wishing to learn the statistical logic used in the arena of DNA forensics and the use of DNA typing in parentage testing. Thus, the scope of this volume is truly the statistical interpretation of DNA evidence.

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THE GREENLAND NORSE: A BIOLOGICAL-ANTHROPOLOGICAL STUDY. MEDDELELSER ON GRØNLAND, MAN AND SOCIETY 24. By Niels Lynnerup. Copenhagen: Commission for Scientific Research in Greenland. 1998. 149 pp. ISBN 87-90369-24-6. \$35.00 (paper).

A furore nonnannorum, libera nos, domine (From the fury of the Northmen, O Lord, deliver us)

The Vikings, vibrant, untamed, and raw, had a strong and unmistakable impact on much of Europe and across the northern seas. Few historic periods or peoples capture our imaginations like the Vikings. Their colonies in Greenland, while never large, are evidence of the amazing capacity of these seaman-farmers.

The colonization of Greenland is synonymous with the name of Erik the Red, who was not just a legendary figure but also a real person with a firm place in history. In

983 or 984 AD, Erik was outlawed from Iceland because of "some killings"; unable to return to his native Norway for similar reasons, Erik decided to explore the unknown and then-uninhabited land to the west sighted earlier. The 3 years of his exile were spent exploring and claiming the southwest coast of this new land. In a stroke of public relations genius, Erik named the new land "Greenland" and upon his return to Iceland, persuaded about two dozen boatloads of people with their livestock to help him colonize the new territory. Others were to follow. The Viking settlements spread along the southwestern coast and lasted for perhaps 500 years. The development and eventual disappearance of the Greenland communities intrigue all who study the Vikings.

Lynnerup's important and ambitious work is a study of all known Norse skeletal material from Greenland in a broad multidisciplinary reconstruction of Norse society.

This was no small task, as materials date from excavations ranging from 1723–1992 AD. As is clear from the introduction, the excavations (and the collected skeletal material) suffer from varying degrees of archaeological and curatorial rigor and reporting. In addition, Lynnerup's mode of skeletal research was hampered by the 18th and 19th century tradition of recovering only skulls. The present publication is based on the author's 1994 Ph.D. dissertation.

The first chapter is a detailed and thorough review of all sites at which skeletal material has been found. The archaeological records, including unpublished reports, are summarized. Some of the most recent archaeological excavations have resulted in the reassessment of older excavations, and these are included in the chapter. The author then located all skeletal material reported to have been collected and sent to Denmark. Unfortunately, not all the skeletal material identified as Norse could be linked directly to archaeological documentation, nor could all skeletal material reported be accounted for. The author estimates a discrepancy of some 10–20 specimens.

The first chapter also summarizes the preservation and extent of the material. Anyone who has tried to tally just what is available for study in this collection can appreciate the scope of this task. For example, boxes labeled as containing a single individual might yield some supernumerary bones, thus indicating the presence of at least one other individual. Lynnerup reports 457 specimens for a MNI of 378, none of whom were entirely complete. Standard methods of assessing age and sex were applied to the fragmentary skeletal material. Lynnerup found a sex ratio that is, on the whole, evenly distributed (male:female = 1.02). However, there seems to be a bias towards females in the younger adult age groups and toward males in the older age groups. This may indicate a higher mortality for young females as Lynnerup suggests, or it may be a bias in the sexing technique. Young individuals may be more gracile and therefore be more likely to be assessed as female. The number of subadults in the samples is low (16%), but this may reflect both differential preservation and differential collection.

Establishing a chronological sequence for the Norse skeletal material was essential, since no diachronic analyses would be possible without placing the specimens in some timeframe. Archaeological and stratigraphic relationships were of limited value for a myriad of reasons. Thus, Lynnerup used calibrated ^{14}C dates on 32 specimens. This was the first comprehensive attempt to generate a chronological sequence for the Norse skeletal material. In addition, Lynnerup uses ^{14}C analyses to document a dietary shift from terrestrial to marine resources. This chapter alone is worth the price of the book.

The second chapter deals with burial practices and principles of interment in Norse Greenland. When the Norse first came to Greenland, they were probably pagan. As such, most people were simply buried on or near their farms, although villages might have had communal burial sites. However, Christianity was introduced into Greenland soon after the first colonists arrived. Therefore, burial presumably shifted to churchyards. Lynnerup's encyclopedic analysis revealed no general picture of horizontal stratification (implying chronology) in the Greenland churchyards. It seemed to him that natural factors (e.g., sea level, coastal erosion, and soil conditions) played the major role in burial distribution. Nevertheless, the earlier churches did seem to segregate burials by gender (albeit incompletely). The gender segregation was not evident at later Norse churchyards. Segregation by age, i.e., burial of neonates, was also practiced, but again only at the very earliest church. Segregation by social status also seems to have been practiced, if only at the largest, most central churches (interestingly, centrally buried individuals have larger skeletal dimensions than those peripherally buried). These and other burial customs correspond to the contemporary Scandinavian pattern, indicating that Norse Greenland was well-integrated with medieval Europe.

The third chapter discusses the physical anthropology of the Greenland Norse. Metric and nonmetric data were collected for various statistical analyses. The aim was to test for synchronic and possible diachronic morphological variation. In addition, stat-

ure was calculated and the Norse material was tested for Inuit admixture. Results of exhaustive morphometric analyses indicate no significant synchronic differences but diachronically, there may have been a slight general decrease in overall skeletal size. The Greenland Norse also tested smaller than contemporary Danish skeletons. Metric analyses failed to detect significant Inuit admixture, in full accordance with historic and archaeological data. Nonmetric analyses failed to show either spatial or temporal differences. Lynnerup had hoped to detect familial patterns through differential trait density, but differences were not statistically significant. He concludes this chapter with a call for DNA analysis to provide information on kinship and intersite relationships. Since the publication of this work, Lynnerup has begun just such analyses.

The fourth chapter is an examination of the paleopathology of the Norse skeletal material. This chapter deals with the conventional osteoarthropathies, trauma, neoplasms, congenital malformations, and growth disturbances. Lynnerup contends that these diseases, while probably disadvantageous to the individual, had little impact on the population as a whole. The most interesting and innovative section of this chapter was the use of infectious middle ear disease (IMED) as a method for evaluating childhood "stress" and general health. Lynnerup proposes at least two mutually exclusive explanations for the slight decrease in IMED from early to late settlements:

- 1) Either IMED directly reflects childhood stress and higher frequencies, thus suggesting a period of greater childhood stress than in the more recent settlement periods; [or]
- 2) the decrease in IMED frequency is due to a higher mortality among afflicted children, so that fewer will survive to display hypopneumatization as adults. Consequently, higher frequencies of IMED in the early period suggest a better state of health which deteriorated during the settlement period. (p. 82)

In any case, the frequencies do not change significantly, and it is difficult to assess whether or not there was in fact a change in childhood stress or even if the method is sufficiently accurate and sensitive to detect such change. Nonetheless, this innovative approach bears more study.

Lynnerup addresses the paleodemography of the Greenland Norse in the fifth chapter. The author begins with an assumption of a starting population of 500 that peaked at 2,000 over the next 200 years. A 100-year "stable" period ensued, followed by 200 years of decline, resulting in complete depopulation. As Lynnerup points out, his model is purely hypothetical and only one of many possible patterns. This model gives a total projected population of 26,500, which supports the figure estimated from the number of interments. With this model, an emigration rate of about 10 people per year over a 200-year period would be sufficient to explain the Norse population decline.

The topic of population decline and eventual extinction is continued in the sixth and last chapter. Those who study the Greenland Norse know that several hypotheses have been proposed to explain their demise. Lynnerup summarizes the six best-known explanations and evaluates each in light of his recent archaeological and osteological work. As Lynnerup so clearly points out, each of the earlier studies of the Norse Greenlanders reflected the ideas and cultural milieu of its time. What we need, he asserts, is to learn to see the Norse through their eyes, not our own. His work is an excellent start in that direction. The last 14 pages of this book consist of a bibliography that is fairly comprehensive and current.

I have only a few small quibbles with this book. The first concerns the maps in Chapter 1. The book would be greatly enhanced by the addition of a comprehensive map showing all of the sites referred to in the text. The general map on p. 9 lacks the detail necessary to locate the sites, and the digitized church maps are out of geographic context. Also, these church maps would be significantly improved by the addition of the burials or skeletons if such data exist. Secondly, some of the data graphs in Chapter 2 are a bit too small to read (e.g., Figs. 29 and 30 on p. 49). These are minor points; all in all, Lynnerup is to be congratulated for producing a first-rate study.

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BIOSOCIAL PERSPECTIVES ON CHILDREN. Edited by Catherine Panter-Brick. New York: Cambridge University Press. 1998. 160 pp. ISBN 0-521-57595-8. \$19.95 (paper).

Some disparate themes in the evolutionary and cross-cultural literature on children are brought together in this slim volume, which takes as its central problem the concept of the "child" or "childhood." The key conclusion is that what constitutes childhood is not fixed or universal, but shaped in important ways by hominid evolutionary history and cultural context. However, this raises the question of whether any aspects of this life stage are universal experiences. What is it that defines "a child," or "childhood?" The tremendous historical and cross-cultural variation in early life experiences belies straightforward definitions. Is the only thing that children have in common their young chronological age and relative biological immaturity? How meaningful or useful are these as analytic criteria, especially relative to other axes of variation (sex, ethnicity, or socioeconomic status)? Can childhood be retained as a meaningful analytic concept that has some utility for comparative analysis, or should the study of childhood fall victim to a relativistic stance that precludes comparison? These are some of the important issues that pervade this volume.

Each of the authors makes clear the ambiguities and tensions in research on children. To date, most researchers have viewed children as "works in progress," neither fully biologically mature nor enculturated or socialized. It seems safe to say that children are often studied for the ways that they contribute to, or represent, something else, and as such they become contested territory in broader debates. The large body of work on child growth and development demonstrates the processes by which the young turn into adults. In turn, child growth is widely used as an index of child health, which is considered a close reflection of stresses in the environment. Psychologists

mine for early life experiences that contribute to disturbances in adult mental function. There is a notable dearth of children's voices in ethnographic writing, where only adults are allowed the authority to speak as informants, even on children's experiences. In his commentary, Martin Richards elaborates on how conceptions of childhood have been at center stage in the nature-nurture debate. On the other hand, it seems predictable that children and the concept of "childhood" will be mired in conflict. From an evolutionary point of view, children are not mere copies of their parents, and this difference may be evident as early as the prenatal period. Children require investments now, with the expectation of fitness and other payoffs later; they force the issue of "tradeoffs."

To start, Barry Bogin proposes that childhood evolved as a novel life history stage over the course of hominid evolution. He defines childhood as a period of prolonged dietary dependency after weaning, which is not analogous to a stage in the life histories of other apes. This stage continues up until 6–7 years of age, when the child achieves some degree of dental and cognitive maturity and is able to provide some of its own food, help with the care of younger siblings, and protect itself from threats. The benefits of such a stage for hominids would be an increase in fertility made possible by food supplementation and sibling care, which would relieve a mother from prolonged nursing and allow her to return to fertility earlier without compromising the survival of existing offspring. From Bogin's perspective, childhood is a species-specific life stage for *Homo sapiens*, with some universal features: food dependency, relatively slow physical growth, "cuteness" to elicit caregiving behaviors, the ability to care for siblings, and an opportunity for prolonged learning. However, while this definition makes sense within hominid evolutionary history, there is much more diversity in what children of this age are doing, and much to be learned about the sources of that

variation. Is childhood a fixed age category or a more plastic developmental category?

Allison James also traces the temporal emergence of childhood by reviewing Philippe Aries's classic argument for the origins of childhood as a cultural construct, imbued with specific emotions and meanings in Western history. She then uses this as a springboard to assert that childhood is not a universal category, but that there are many "childhoods." From this perspective, any biological characterizations of childhood need to be seen as setting the context, as opposed to determining or defining children's experiences. Several examples illustrate the highly variable nature of the early lifespan, and the ways that childhoods reflect cultural trends. At the same time, James argues that children should be studied on their own terms, and recognized as possessing their own culture on which they are authoritative informants and not merely as passive receptacles of cultural messages. A clear conclusion from James's work is that universalizing global child policies (e.g., child health, rights, or labor laws) is inevitably problematic due to cross-cultural differences in the valuation of children.

Robert Levine takes the more traditional approach of examining how cultural differences in child-rearing practices channel biological and social development so as to produce culturally functional adults. As such, his work is an important corrective to standard psychological approaches that assume uniformity in child development. He also provides a succinct historical and conceptual review of the child psychology literature and the anthropological contributions to that literature. His environmental optimization theory and description of the "cultural priming" process are important contri-

butions, and relevant to anthropologists interested in child development.

While life history stage (i.e., childhood) is clearly an important aspect of human biological variation, it is, like other aspects of variation, given form and meaning within a larger social and ecological context. This point is driven home in Catherine Panter-Brick's chapter on child health. Here the various methods biological anthropologists use to assess children are described, but they are presented as tools in the service of understanding child health as an outcome of specific generative contexts and processes. Their status as "gold standards" for the evaluation of child health in diverse environments is questioned.

In summary, the authors walk a fine line between emphasizing the context of children's lives and those lives themselves, and also between understanding children on their own terms and as individuals with particularly fluid ontogenetic pathways that respond to environmental challenges in ways that can have long-term effects. They present the current state of research on children from a diversity of anthropological perspectives, and bring to the fore the inherent dilemmas in approaching children as research subjects in the field. This book is most useful as a set of review articles that cover a wide range of topics related to children, and is accessible to undergraduate and graduate student readers. It is broadly relevant to researchers interested in a life history perspective on human variation, as well as to those with more specific interests in the early part of the lifespan.

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THE MYTH OF HUMAN RACES. By Alain F. Corcos. East Lansing, MI: Michigan State University Press. 1997. 214 pp. ISBN 0-87013-439-6. \$17.95 (paper).

The title of this short and easy to read book gives away the punch line. This book is

a series of short essays that debunk the idea that humans can be classified into discrete races. The book is geared more toward undergraduate students and the public rather than graduate students or professionals. The intended audience is clear from the book's preface; after describing how many

anthropologists and biologists have abandoned the race concept, the author states, "Now it is time for the public at large to abandon the belief in the existence of human races, a belief that has done great harm to human relations" (p. xiv). This is an admirable goal, and as those who have taught courses in human variation know, it is important to distinguish between race and variation. Variation exists within and among populations, and it is important to point out to students that a rejection of the race concept does not mean a rejection of variation, but rather the rejection of a particular, pre-Darwinian view of how variation is structured.

This book does a fine job of simultaneously illustrating the nature of human variation and rejecting a racial mode of analysis. Problems with the race concept are explored and debunked throughout the book, including discussion of problems in defining race and enumerating human races. This book is not a textbook per se, but rather a series of 25 short chapters, each averaging about 7 pages with notes and references. The chapters are organized in three sections. Part One consists of six chapters concerned with definitions and fallacies of the race concept, including a very nice chapter on the erroneous views associated with "blood" (e.g., "full blood," "half-blood," and "tainted blood").

While Part One focuses on commonly held views on race, Part Two deals with the influence of race in scientific thought, including evolutionary views, natural selection and race, race formation in relation to speciation, and the relationship of race and IQ. Concerning the last, Corcos points out an important, though often overlooked, aspect of the race-IQ debate, i.e., race is not an appropriate unit of analysis. This section also has a chapter on race and disease, nicely commenting on the common use of race as a risk factor in epidemiological analyses. The use of race as a discrete variable obscures variation. For example, if you were interested in looking at the relationship of a disease with some continuous variable such as skin color, you should use that variable and not a racial designation, such as "black" or "white," which would obscure the under-

lying relationship. I think this is a problem that anthropologists and human biologists need to be aware of, since many continue to use race as a crude proxy variable for a multitude of biological and social traits. I suspect that the frequent use of race as a proxy measure in epidemiology is in part due to the tenacity of the race concept, but is perhaps also due to the ubiquitous nature of racial classification in morbidity and mortality records (the frequency of which is in part due to continued acceptance of the race concept).

Part Three of this book deals with the nature of biological variation at different levels, contrasting such views with the racial approach. The various chapters examine several different topics to reemphasize problems with the race concept, including the relationship of races and species, individual genetic variation, and several short chapters on skin color. One of the most interesting chapters focuses on "Myths About Ancestry." Here, Corcos examines popular notions about ancestry and shows that they are not genetically accurate. He looks briefly at the statistical nature of inheritance and meiosis, and as an example, shows that six generations in the past a person has more potential ancestors than chromosomes. The implication here is that the more distant an ancestor, the higher the probability that that ancestor did not contribute even a single chromosome. Corcos then goes on to contrast this view of inheritance with commonly used statements about ancestry, where people describe themselves as some fraction (e.g., "one-eighth") of one race or the other.

While in general I enjoyed the book, I noted several problems, inaccuracies, and misleading statements. For example, Corcos describes Lewontin's results that only 6% of the total genetic variation exists between traditionally defined geographic races, but does not note that more recent work shows a range closer to 10–15%. The implication remains the same ("race" only accounts for a small proportion of variation, and most variation exists *within* populations), but a more up-to-date figure would have been useful. In another chapter, Corcos describes early studies on the relationship between nasal index and

climate, but does not mention later work by Beals and others. Again, this is not a major problem and does not detract from the basic message, but it would be nice to have citations that are more current. The citation dates sometimes result in misleading statements, such as a sentence suggesting that some anthropologists “*still* assume that racial traits exist” (p. 79, italics mine) and then citing a 1964 paper. The biggest problem I had was with a brief description of the multiregional evolution model of human origins, which Corcos describes as Coon’s model, and not the modern version promoted by Wolpoff and others. I grow somewhat weary of continuing to see multiregional evolution incorrectly described as parallel evolution.

Despite these problems, the book does a good job of refuting the race concept as applied to human variation. This book is intended for, and well-suited for, a general audience, including undergraduates with

limited exposure to studies of human variation. The book is written in an easily accessible conversational style. There are few references, and the coverage of selected variations (e.g., blood types, skin color) is quite variable, often with little specific data. This book is clearly not a general text on human biological variation, but that is not its purpose. The book does what it sets out to do: to debunk the race concept, in a clear and interesting manner for the novice. It would be a useful supplementary text in introductory courses on biological anthropology and human variation. I hope that the author comes out with a revised edition that corrects some of the problems and provides additional current citations.

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BOOKS RECEIVED

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